

Amendment Dated November 30, 2007
Serial No. 10/722,480

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IN THE CLAIMS

Claim 1. (Currently Amended) A method of scheduling central processing unit (CPU) usage by a given task, the method comprising the steps of:

associating said the given task with a top level class and a sub-class, the sub-class being one of a plurality of sub-classes directly associated with a parent class; and

determining a target CPU usage for said the given task from a weight associated with said the sub-class representing a relative share of a target CPU usage associated with the parent class and a target CPU usage associated with said the top level class;

wherein the step of determining the target CPU usage for the given task comprises the steps of:

forming a quotient by dividing the weight associated with the sub-class by a sum of weights associated with the plurality of sub-classes directly associated with the parent class; and
multiplying the target CPU usage associated with the parent class by the quotient.

Claim 2. (Original) The method of claim 1 further comprising:

determining an actual usage of said CPU by said given task in a first predetermined evaluation interval;

determining a penalty duration for said given task based on said actual usage and said target CPU usage for said given task; and

applying a penalty to said given task for said penalty duration during a second predetermined evaluation interval.

Claim 3. (Original) The method of claim 2 wherein said applying said penalty comprises demoting a scheduling priority associated with said given task.

Claim 4. (Original) The method of claim 2 wherein said penalty is applied continuously for said penalty duration.

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Claim 5. (Original) The method of claim 2 wherein said penalty is applied during a plurality of periods over said second predetermined evaluation interval, such that a total duration of application of said penalty is equivalent to said penalty duration.

Claim 6. (Original) The method of claim 2 wherein said actual usage of said CPU by said given task in said first predetermined evaluation interval is a first actual usage and said penalty duration based on said first actual usage is a first penalty duration, said method further comprising:

determining a second actual usage of said CPU by said given task in said second predetermined evaluation interval;

determining a second penalty duration for said given task based on said second actual usage and said target CPU usage for said given task; and

applying said penalty to said given task for said second penalty duration during a third predetermined evaluation interval.

Claims 7-9. (Canceled)

Claim 10. (Currently Amended) The method of ~~claim 8~~ claim 1, wherein said the top level class is ~~said the~~ parent class of said the sub-class.

Claim 11. (Currently Amended) The method of ~~claim 8~~ claim 1, wherein a further sub-class of ~~said the~~ the top level class is ~~said the~~ parent class of said the sub-class.

Claim 12. (Currently Amended) A scheduler for execution in a kernel of An apparatus for scheduling usage of a central processing unit (CPU), the scheduler containing data and instructions stored in a computer readable medium to enable tasks to be scheduled for execution by the kernel, the data and instructions allowing the scheduler to perform a method comprising the steps of operable to:

associate associating a given task with a top level class and a sub-class, the sub-class being one of a plurality of sub-classes directly associated with a parent class; and

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~~determine~~ determining a target CPU usage for ~~said the~~ given task from a weight associated with ~~said the~~ sub-class representing a relative share of a target CPU usage associated with the parent class and a target CPU usage associated with ~~said the~~ top level class;

wherein the step of determining the target CPU usage for the given task comprises the steps of:

forming a quotient by dividing the weight associated with the sub-class by a sum of weights associated with the plurality of sub-classes directly associated with the parent class; and
multiplying the target CPU usage associated with the parent class by the quotient.

Claim 13. (Currently Amended) The ~~apparatus scheduler~~ of claim 12, ~~further operable to~~
wherein the method further comprises the steps of:

~~determine~~ determining an actual usage of ~~said the~~ CPU by ~~said the~~ given task in a first predetermined evaluation interval;

~~determine~~ determining a penalty duration for ~~said the~~ given task based on ~~said the~~ actual usage and ~~said the~~ target CPU usage for ~~said the~~ given task; and

~~apply~~ applying a penalty to ~~said the~~ given task for ~~said the~~ penalty duration during a second predetermined evaluation interval.

Claim 14. (Currently Amended) A computer readable medium containing computer-executable instructions that, when performed by an apparatus for scheduling usage of a central processing unit (CPU) in a kernel, cause ~~said the~~ apparatus to:

associate a given task with a top level class and a sub-class, the sub-class being one of a plurality of sub-classes directly associated with a parent class; and

determine a target CPU usage for said the given task from a weight associated with said the sub-class representing a relative share of a target CPU usage associated with the parent class
and a target CPU usage associated with said the top level class;

wherein the step of determining the target CPU usage for the given task comprises the steps of:

forming a quotient by dividing the weight associated with the sub-class by a sum of weights associated with the plurality of sub-classes directly associated with the parent class; and
multiplying the target CPU usage associated with the parent class by the quotient.

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Claim 15. (Currently Amended) The computer readable medium of claim 14, further containing wherein said computer-executable instructions that, when performed by the apparatus for scheduling usage of the central processing unit (CPU) in the kernel, further cause said the apparatus to:

determine an actual usage of said the CPU by said the given task in a first predetermined evaluation interval;

determine a penalty duration for said the given task based on said the actual usage and said the target CPU usage for said the given task; and

apply a penalty to said the given task for said the penalty duration during a second predetermined evaluation interval.

Claim 16. (New) The scheduler of claim 13, wherein the step of applying the penalty comprises demoting a scheduling priority associated with the given task.

Claim 17. (New) The scheduler of claim 13, wherein the penalty is applied continuously for the penalty duration.

Claim 18. (New) The scheduler of claim 13, wherein the penalty is applied during a plurality of periods over the second predetermined evaluation interval, such that a total duration of application of the penalty is equivalent to the penalty duration.

Claim 19. (New) The scheduler of claim 13, wherein the actual usage of the CPU by the given task in the first predetermined evaluation interval is a first actual usage and the penalty duration based on the first actual usage is a first penalty duration, the method further comprising the steps of:

determining a second actual usage of the CPU by the given task in the second predetermined evaluation interval;

determining a second penalty duration for the given task based on the second actual usage and the target CPU usage for the given task; and

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applying the penalty to the given task for the second penalty duration during a third predetermined evaluation interval.

Claim 21. (New) The computer readable medium of claim 15, wherein applying the penalty comprises demoting a scheduling priority associated with the given task.

Claim 17. (New) The computer readable medium of claim 15, wherein the penalty is applied continuously for the penalty duration.

Claim 22. (New) The computer readable medium of claim 15, wherein the penalty is applied during a plurality of periods over the second predetermined evaluation interval, such that a total duration of application of the penalty is equivalent to the penalty duration.

Claim 23. (New) The computer readable medium of claim 15, wherein the actual usage of the CPU by the given task in the first predetermined evaluation interval is a first actual usage and the penalty duration based on the first actual usage is a first penalty duration, the computer readable medium further containing computer-executable instructions that, when performed by the apparatus for scheduling usage of the central processing unit (CPU) in the kernel, further cause the apparatus to

determine a second actual usage of the CPU by the given task in the second predetermined evaluation interval;

determine a second penalty duration for the given task based on the second actual usage and the target CPU usage for the given task; and

apply the penalty to the given task for the second penalty duration during a third predetermined evaluation interval.